

ABSTRACT

A micro acoustic spectrum analyzer for determining the frequency components of a fluctuating sound signal comprises a microphone to pick up the fluctuating sound signal and produce an alternating current electrical signal; at least one microfabricated resonator, each resonator having a different resonant frequency, that vibrate in response to the alternating current electrical signal; and at least one detector to detect the vibration of the microfabricated resonators. The micro acoustic spectrum analyzer can further comprise a mixer to mix a reference signal with the alternating current electrical signal from the microphone to shift the frequency spectrum to a frequency range that is a better matched to the resonant frequencies of the microfabricated resonators. The micro acoustic spectrum analyzer can be designed specifically for portability, size, cost, accuracy, speed, power requirements, and use in a harsh environment. The micro acoustic spectrum analyzer is particularly suited for applications where size, accessibility, and power requirements are limited, such as the monitoring of industrial equipment and processes, detection of security intrusions, or evaluation of military threats.